

## **Testimony of Dr. Anthony C. Janetos**

**Subcommittee on Energy and Air Quality, House of Representatives Committee on**

**Energy and Commerce**

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Mr. Chairman, and members of the Committee, thank you for asking me to be here to testify today. My name is Anthony C. Janetos, and I am the Director of the Joint Global Change Research Institute, a joint venture between the Pacific Northwest National Laboratory and the University of Maryland. My oral testimony, and this written statement will focus on the report that was recently released by the Climate Change Science Program (CCSP) and US Department of Agriculture, *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States*. This report is one of the 21 Synthesis and Assessment reports undertaken by the US Climate Change Science Program, the purpose of which is to synthesize the scientific literature on topics of concern to US policy makers, private sector decision makers, and the general public.

### **Charge and Focus of the Report**

The charge for this report was to evaluate the influence that changes and variability in climate have had, and are likely to have on US ecosystems and ecosystem services.

Specifically, we were asked to look at agriculture, land resources, water resources, and

biodiversity, and we have written in-depth chapters on each of these topics. We focused our efforts on understanding the data for the past several decades, and evaluating the potential for impacts over the next several decades, while remaining mindful of impacts that will take longer to express themselves. We were asked by the CCSP to assess the existing peer-reviewed scientific literature, in addition to assess the adequacy of existing monitoring programs for documenting climate change impacts, and to make inferences about the state of ecosystem services. We were not chartered to make recommendations or give advice to the government for policy formulation, nor for research. We were also not chartered to investigate the potential for adaptation and coping responses, as this was the topic of a separate report from the CCSP.

### **Authors and Review Process**

The author team that we assembled had representatives from universities, the National Laboratories, and non-governmental organizations. The coordinating lead authors were Peter Backlund, of the National Center for Atmospheric Research, myself, and David Schimel, CEO of the National Ecological Observatory Network. In addition to ourselves, 34 additional scientists contributed either to leading individual chapters or to assisting with text in their particular specialties. Our report was overseen by a FACA-chartered committee, chaired by Thomas Lovejoy, President of the H. John Heinz III Center for Science, Economics, and the Environment. In addition to our FACA committee review, we also went through a public comment period, and technical review by experts and government scientists. We responded to every review comment we received, and all of

the review comments and our responses are publicly available. Following our final meeting and sign-off from the FACA oversight committee, our report went through the prescribed interagency clearance process, as have all other of the completed CCSP Synthesis and Assessment reports. We are confident that our review of the literature, our findings, and our judgments have been thoroughly and professionally reviewed, and that our conclusions are sound.

I have attached the Executive Summary of the report to this statement as part of the written record, so I will not attempt to summarize the entire document here. However, I will point out the overarching conclusions of the report, and offer some personal observations about their importance.

### **Overarching Conclusions of the Report**

1. Climate changes – temperature increases, increasing CO<sub>2</sub> levels, and altered patterns of precipitation – are already affecting US water resources, agriculture, land resources, and biodiversity.
2. Climate change will continue to have significant effects on these resources over the next few decades and beyond.
3. Many other stresses and disturbances are also affecting these resources.
4. Climate change impacts on ecosystems will affect the services that ecosystems provide, such as cleaning water and removing carbon from the atmosphere, but

we do not yet possess sufficient understanding to project the timing, magnitude, and consequences of many of these effects.

5. Existing monitoring systems, while useful for many purposes, are not optimized for detecting the impacts of climate change on ecosystems.

### **Implications of These Conclusions**

There has been a profound change in the way in which the scientific community thinks and writes about the impacts of climate change on ecosystems and natural resources. For those of us who have been working on these issues for some time (in my own case, approaching 20 years), we have moved from the cautious examination of modeling results to a realization that there is now substantial documentation of current impacts. In many cases, these impacts appear to be happening more rapidly and have greater magnitude than we might have expected even as little as a decade ago.

There is a large literature on the responses of ecosystems and natural resources to climate variability, whether that variability was natural, or caused by human activities. There is now an increasing literature that not only documents the responses of ecosystems, individual animal and plant species, and natural resources to climate variability, but in addition, begins to document that human activities themselves are driving the changes in the climate system. This progression is clearly seen over the last several IPCC reports, for example, and we also point it out in our CCSP report.

This is not to say that all the science of climate impacts is settled – far from it. We point out in our report many areas in which improved scientific research and better observations would continue to reduce uncertainties in our understanding, and improve our capacity to make forecasts about impacts. But it does mean that we are beginning to see impacts in the natural world already, when the climate drivers are still relatively modest, compared to reasonable scenarios of the future that the scientific community has explored. It reminds us that while our models are imperfect and can be improved, they have nevertheless yielded important insights into the responses of ecological systems to a changing climate. The author team of our report is currently working on additional publications to explore those research topics that in our view would enhance our ability to understand and predict climate-related impacts better than we do today.

It will remain important to devote efforts to continued documentation of the state of ecosystems, to research to understand how that state reacts to changes in climate, and to models that can give us expectations for the future. However, it will be just as important to invest in strategies for coping and adaptation to those impacts that cannot be avoided as it is to construct strategies for greenhouse gas emissions. Adapting to or coping with climate change that cannot be avoided is an immediate challenge for both research and effective management of natural resources, and in our collective view is a critical need. The successful implementation of adaptation strategies for natural resources and ecosystems will need to take into account that these systems face many stresses, and that there are multiple stakeholders with legitimate interests in them. Most importantly, from

our perspective, though, is that adaptation strategies must be based on the best available science.